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010416421
WPI Acc No: 95-317735/199541
Light-diffusing, self-adhesive compsn. prepn. - by adding crosslinking agent and light diffusing agent to self-adhesive resin
Patent Assignee: KIMOTO KK (KIMO-N)
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Main IPC	Week
JP 7216328	A	19950815	JP 9444669	A	19940204	C09J-009/00	199541 B

Priority Applications (No Type Date): JP 9444669 A 19940204
Patent Details:

Patent	Kind	Lan	Pg	Filing Notes	Application	Patent
JP 7216328	A		5			

Abstract (Basic): JP 7216328 A

The light-diffusing self-adhesive compsn. is prepared by adding a cross-linking agent and a light diffusing agent to a self-adhesive resin. The light-diffusing, self-adhesive compsn. is prepared by adding 0.05 to 20, pref. 0.5 to 10 pts. wt. of an isocyanate and 5 to 300, pref. 10 to 100 pts. wt. of particles of crosslinked polystyrene resin to 100 pts. wt. of a self-adhesive resin consisting of an acrylic ester copolymer. Preferred acrylic ester copolymer is made from ethyl acrylate, butyl acrylate, 2-ethylhexyl acrylate, etc.

ADVANTAGE - Light diffusing agent is dispersed homogeneously in a simple process and the light-diffusing self-adhesive compsn. produces a planar light source which shows no oozing-out of self-adhesive, strong adhesion to base sheet and high brightness.

(11) Patent Kokai [laid-open] No. : Hei 7[1995]-216328

(12) PATENT KOKAI PUBLICATION (A)

(19) JAPANESE PATENT OFFICE (JP)

(21) Patent Application No. : Hei 6[1994]-44669

(22) Patent Application Date : February 4, 1994

(43) Patent Kokai Publication Date : August 15, 1995

(51) Int. Cl.[6] ID Codes Sequence Nos. for Office Use FI
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133/06 JDD
175/04 JFC
JFH

No. of Inventions : 3 (Total 5 pages in Japanese original)

Examination Request : Not requested

(54) [Title of the invention]
Pressure sensitive adhesive composition with light diffusion property
[Hikari Kakusansei Nenchakuzai Soseibutsu]

(57) [Abstract]
[Constitution]
A pressure sensitive adhesive composition with light diffusion property includes 1) 100 parts by weight ester acrylate copolymer, 2) 10 to 100 parts by weight crosslinked polystyrene resin particles, and 3) 0.5 to 10 parts by weight isocyanate.

[Effects]
It is possible to attain a plane light source with high luminance showing good adhesion to a base material without oozing of pressure sensitive adhesive agent, and is capable of homogeneous dispersion of diffusion agents with a simple a simple stirring measure.

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same as the above

Amendments: There are no amendments to this patent.

[note: All names, addresses, company names, and brand names are translated in the most common manner. Japanese language does not have singular or plural words unless otherwise specified with numeral prefix or general form of plurality suffix. translator's note]

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[Effects]
It is possible to attain a plane light source with high luminance showing good adhesion to a base material without oozing of pressure sensitive adhesive agent, and is capable of homogeneous dispersion of diffusion agents with a simple a simple stirring measure.

[CLAIMS]
[Claim item 1]
A pressure sensitive adhesive composition with light diffusion property has characteristics as such that resin particles are added as crosslinking agents and light diffusion agents into a pressure sensitive adhesive resin.

[Claim item 2]
The pressure sensitive adhesive composition with light diffusion property according to the claim item 1, wherein isocyanate and crosslinked polystyrene resin particles are added to a pressure sensitive adhesive resin comprising ester acrylate copolymer.

[Claim item 3]
The pressure sensitive adhesive composition with light diffusion property according to the claim item 2, wherein 0.05 to 20 parts by weight isocyanate and 5 to 300 parts by weight crosslinked polystyrene resin particles are added to 100 parts by weight pressure sensitive adhesive resin comprising ester acrylate copolymer.

[DETAILED EXPLANATION OF THE INVENTION]
[0001]
[Fields of industrial application]
This invention relates to a pressure sensitive adhesive composition with light diffusion property that is used by coating on a film and the like in order to emit a light source of LED or liquid crystal back light in uniform as well as plane-like manner.

[0002]
[Prior art]
The ones in which acryl group pressure sensitive adhesive agent, inorganic particles are dispersed have been generally used for said type of applications. However, this type shows difficulty in attaining a uniform dispersion stability; and furthermore, it tends to cohere within several minutes or within several days to tend to result in gelation. And therefore, addition of dispersion stabilizers of amine group has been made to stabilize said dispersion after thorough kneading of a pressure sensitive adhesive agent and inorganic particles in a dispersion device such as three rolls and the like (make reference to the Japanese Patent Application Kokai Sho 56[1981]-116767 disclosure).

[0003]

According to pressure sensitive adhesive agents in general, because it is difficult to attain performances such as sufficient cohesive force or heat resistance with ordinary polymers, crosslinking using isocyanate crosslinking or epoxy crosslinking and the like has been conducted. However, when dispersion stabilizer of amine group is added to a pressure sensitive adhesive agent using compounds having isocyanate group or epoxy group, because crosslinking and curing mechanism become inhibited, it is not possible to use dispersion stabilizers of amine group. And therefore, in order to use dispersion stabilizers of amine group, it is necessary to select such pressure sensitive adhesive agents which are of either non-crosslinking type or one solution crosslinking type without isocyanate group or epoxy group; however, such pressure sensitive adhesive agents tend to cause an oozing phenomenon of a pressure sensitive adhesive agent due to low crosslinking density causing small cohesive force of resin. And in addition, close adhesion to a base material remains poor, and when there is a position slippage during pasting onto an adherend, and repasting work is attempted, adhesive transfer of pressure sensitive adhesive agent occurs to invite a decline in yield of member materials. Although addition of crosslinking agents such as isocyanate and the like may be made in order to improve cohesive force of a resin and close adhesion to a base material, as explained previously, it was not possible to modify resins due to reaction with dispersion stabilizers of amine group resulting in gelation.

[0004]

On the one hand, expensive dispersion equipment such as three rolls is required in order to disperse inorganic particles; and in addition, because resins showing high pressure sensitive adhesive property are used, it required much time to clean said dispersion device during process change to lead to higher cost and productivity decline. And therefore, improvement on productivity has been made through production of a large volume of dispersion solution through one time dispersion solution production in order to reduce work of dispersion process; however, this results in a large volume of inventory to consequently forcing a need to consider a storage stability over long period of time. In addition, as it is necessary to pack a large amount of inorganic particles in resins to display a light diffusion effects, it increases unnecessary hiding property to reduce luminance of the light source causing difficulty is providing a sharp and clear display.

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[Claim item 1]
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The pressure sensitive adhesive composition with light diffusion property according to the claim item 2, wherein 0.05 to 20 parts by weight isocyanate and 5 to 300 parts by weight crosslinked polystyrene resin particles are added to 100 parts by weight pressure sensitive adhesive resin comprising ester acrylate copolymer.

[DETAILED EXPLANATION OF THE INVENTION]
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This invention relates to a pressure sensitive adhesive composition with light diffusion property that is used by coating on a film and the like in order to emit a light source of LED or liquid crystal back light in uniform as well as plane-like manner.

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The ones in which acryl group pressure sensitive adhesive agent, inorganic particles are dispersed have been generally used for said type of applications. However, this type shows difficulty in attaining a uniform dispersion stability; and furthermore, it tends to cohere within several minutes or within several days to tend to result in gelation. And therefore, addition of dispersion stabilizers of amine group has been made to stabilize said dispersion after thorough kneading of a pressure sensitive adhesive agent and inorganic particles in a dispersion device such as three rolls and the like (make reference to the Japanese Patent Application Kokai Sho 56[1981]-116767 disclosure).

[0005]
[Subjects solved by this invention]
The purpose of this invention is to improve above-explained series of problem points by offering a pressure sensitive adhesive agent with light diffusion property that does not show oozing of pressure sensitive adhesive agent, and shows good close adhesion with a base material and easy uniform mixing of light diffusion agents, and furthermore, is capable of providing a plane light source with high luminance.

[0006]
[Measures used to solve the subjects]
This invention's pressure sensitive adhesive composition with light diffusion property has characteristics as such that resin particles are added to a pressure sensitive adhesive resin as a crosslinking agent and a light diffusion agent. That is to say, this invention was completed based on findings that through use of resin particles in the place of conventional inorganic particles, it enables easy uniform mixing without requiring addition of dispersion stabilizers or equipment such as three rolls, and in addition, it enables display of high light diffusion effect as well as high luminance through use of resin particles, and furthermore, it can significantly improve a close adhesion with a base material through great reduction of oozing or adhesive transfer of pressure sensitive adhesive agent with easy crosslinking of resins as it does not require use of dispersion stabilizers.

[0007]
As for the pressure sensitive adhesive resins used in this invention, the ones showing pressure sensitive adhesive property at regular temperature may be used; and for instance, (meth)acryl group resins or polyester group resins and the like may be mentioned; and it is all right to add plasticizers or tackifiers and the like as needed to adjust viscoelastic behaviors or interfacial characteristics. As for the tackifiers, natural goods such as rosin, modified rosin, rosin ester, terpene resin, or terpene phenol resins and the like, and their derivatives; and synthetic resins such as cumaron. indene resin, styrene group resin, phenol resin, or xylene resin and the like may be used. The ones which are particularly recommended as pressure sensitive adhesive resins, ester acrylate copolymers comprising monomers such as ethyl acrylate, butyl acrylate, or 2-ethyl hexyl acrylate and the like may be mentioned. These provide prescribed viscoelastic behaviors or interfacial characteristics without addition of tackifiers and the like through copolymerization of ester acrylate showing varied number of carbon atoms at side chains or branches at prescribed ratio. In addition, ester acrylate also snows a characteristic of easy adjustment of cohesive force through addition of crosslinking agents.

[0008]

As for the crosslinking agents, isocyanates which isocyanate crosslink through a reaction with hydroxyl groups, carboxyl groups, or amino groups and the like in the pressure sensitive adhesive resins; epoxy resins which epoxy crosslink through a reaction with carboxyl group or amino group in the pressure sensitive adhesive resins; methylol converted melamine resin or methylol converted urea resin that crosslinks with hydroxyl groups or carboxyl groups within the pressure sensitive adhesive resin through condensation of methylol groups; or metal salts or metal hydroxides of which metal ions couple with carboxyl group in the pressure sensitive adhesive resins may be used.

[0009]

As for the particularly preferred agents among crosslinking agents, isocyanates are recommended. As isocyanates have many types of functional groups which react, they can be used for various pressure sensitive adhesive resins; and in addition, isocyanates react mutually to provide high molecular weight to enable to improve cohesive force; and furthermore, they show excellent close adhesive properties. As for the rate of addition of crosslinking agents, although it varies according to the types of pressure sensitive adhesive resins or crosslinking agents used, when polyester resins or acryl resins are used as pressure sensitive adhesive resins, and when isocyanates are used as crosslinking agents, it is generally 0.05 to 20%, or more preferably, 0.5 to 10 % based on pressure sensitive adhesive resins. It is possible to increase crosslinking density by setting to at least 0.05% to improve cohesive force of resins; and it is possible to avoid excess curing to provide appropriate initial adhesive force and pressure sensitive adhesive force by setting to at most 20%. In addition, the terms "%" and "parts" used in this specification refer to weight % and parts by weight unless otherwise specified.

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[0005]
[Subjects solved by this invention]
The purpose of this invention is to improve above-explained series of problem points by offering a pressure sensitive adhesive agent with light diffusion property that does not show oozing of pressure sensitive adhesive agent, and shows good close adhesion with a base material and easy uniform mixing of light diffusion agents, and furthermore, is capable of providing a plane light source with high luminance.

[0006]
[Measures used to solve the subjects]
This invention's pressure sensitive adhesive composition with light diffusion property has characteristics as such that resin particles are added to a pressure sensitive adhesive resin as a crosslinking agent and a light diffusion agent. That is to say, this invention was completed based on findings that through use of resin particles in the place of conventional inorganic particles, it enables easy uniform mixing without requiring addition of dispersion stabilizers or equipment such as three rolls, and in addition, it enables display of high light diffusion effect as well as high luminance through use of resin particles, and furthermore, it can significantly improve a close adhesion with a base material through great reduction of oozing or adhesive transfer of pressure sensitive adhesive agent with easy crosslinking of resins as it does not require use of dispersion stabilizers.

[0007]
As for the pressure sensitive adhesive resins used in this invention, the ones showing pressure sensitive adhesive property at regular temperature may be used; and for instance, (meth)acryl group resins or polyester group resins and the like may be mentioned; and it is all right to add plasticizers or tackifiers and the like as needed to adjust viscoelastic behaviors or interfacial characteristics, As for the tackifiers, natural goods such as rosin, modified rosin, rosin ester, terpene resin, or terpene phenol resins and the like, and their derivatives; and synthetic resins such as cumaron. indene resin, styrene group resin, phenol resin, or xylene resin and the like may be used. The ones which are particularly recommended as pressure sensitive adhesive resins, ester acrylate copolymers comprising monomers such as ethyl acrylate, butyl acrylate, or 2-ethyl hexyl acrylate and the like may be mentioned. These provide prescribed viscoelastic behaviors or interfacial characteristics without addition of tackifiers and the like through copolymerization of ester acrylate showing varied number of carbon atoms at side chains or branches at prescribed ratio. In addition, ester acrylate also snows a characteristic of easy adjustment of cohesive force through addition of crosslinking agents.

[0010]
As for the light diffusion agents, any types may be used providing they are resin particles showing solvent resistance against solvent used; and it is recommended to use the ones showing less hiding property. As such agents, for instance, crosslinked acryl group resin particles having the main component of polymethyl methacrylate, crosslinked polystyrene group resin particles, or silicone group resin particles and the like may be mentioned. Although it cannot be simply states as to the particularly preferred agents among said light diffusion agents in accordance with refractive index of resins which are used or types of crosslinking agents, when acryl group resins and crosslinking agent of isocyanates are used, use of crosslinked polystyrene resin particles is recommended. As for the rate of addition of light diffusion agents, although it varies according to light diffusion property required, types of resin particles, and particle diameter of resin particles, it may be generally 5 to 300 % , or more preferably, 10 to 100 % based on pressure sensitive adhesive resins. The reason for specifying as 5% is to attain appropriate light diffusion property; and the reason for specifying as 300% is so not to reduce pressure sensitive adhesive force.

[0011]
Then, as for the mixing method of these, first of all, light diffusion agents are mixed in a solvent, and after dispersing and mixing this solution and pressure sensitive adhesive resins, crosslinking agents are added prior to use, and then, is used. When they are mixed and are immediately used, it is all right to add crosslinking agents, and, then, may be dispersed and mixed with pressure sensitive adhesive resins.

[0012]
[Actions]
Through above-explained constitution, it becomes possible to uniformly disperse with a simple stirring; and therefore, there is no need for studies on addition of dispersion stabilizers or dispersion device such as three rolls and the like. In addition, because resin particles are used, display with high light diffusion effects as well as high luminance becomes possible. As there is no need to use dispersion stabilizers, crosslinking of resins can be conducted easily to significantly reduce oozing or adhesive transfer of pressure sensitive adhesive agents, and furthermore, it is possible to significantly improve close adhesion to a base material.

[0013]
[Examples]
[EXAMPLE 1]

- polyester resin (NV: 100%) 100 parts
  (Bylon RV550: made by Toyo Boseki K.K.)
- xylene resin (tackifier, NV:80%) 100 parts
  (Nikanol H80: made by Mitsubishi Gas Chemical K.K.)
- silicone resin particles 100 parts
  (Tosspearl 120: made by Toshiba Silicone K.K.)
- ethyl acetate 100 parts
- butyl acetate 100 parts
- isocyanate (crosslinking agent, NV: 75%) 10 parts
  (Takenate A10: made by Takeda Yakuhin Kogyo K.K.)

[note: All above-explained brand names and brand names hereafter are translated phonetically. translator's note]

[0014]
[EXAMPLE 2]

- ester acrylate copolymer resin (NV: 40%) 100 parts
  (SK Dyne 1102 X : made by Soken Kagaku K.K.)
- crosslinked acryl group resin particles 56 parts
  (MR-7HG: made by Soken Kagaku K.K.)
- ethyl acetate 50 parts
- butyl acetate 50 parts
- epoxy resin (crosslinking agent) 0.6 parts
  (SK Dyne E-AX: made by Soken Kagaku K.K.)

[0015]
[EXAMPLE 3]

- ester acrylate copolymer resin (NV: 40%) 100 parts
  (Rikidyne AR-2120 EA: made by Rikidyne K.K.)
- crosslinked polystyrene resin particles 8 parts
  (Teku Polymer SBX-6: made by Sekisui Kaseihin Kogyo K.K.
- ethyl acetate 50 parts
- butyl acetate 50 parts
- isocyanate (crosslinking agent, NV: 75%) 0.4 parts
  (Collonate L: made by Nihon Polyurethane Kogyo K.K.)

[0016]
[COMPARATIVE EXAMPLE 1]
Instead of crosslinked polystyrene resin particles in the example 3, calcium carbonate (Sunlite SL-700: made by Takehara Kagaku Kogyo K.K.) 8 parts were used.

[0017]
[COMPARATIVE EXAMPLE 2]
Instead of crosslinked polystyrene resin particles in the example 3, calcium carbonate (Sunlite SL-700: made by Takehara Kagaku Kogyo K.K.) 40 parts were used.

[0013]
[Examples]
[EXAMPLE 1]
- o polyester resin (NV: 100%) 100 parts
  (Bylon RV550: made by Toyo Boseki K.K.)
- o xylene resin (tackifier, NV:80%) 100 parts
  (Nikanol H80: made by Mitsubishi Gas Chemical K.K.)
- o silicone resin particles 100 parts
  (Tosspearl 120: made by Toshiba Silicone K.K.)
- o ethyl acetate 100 parts
- o butyl acetate 100 parts
- o isocyanate (crosslinking agent, NV: 75%) 10 parts
  (Takenate A10: made by Takeda Yakuhin Kogyo K.K.)

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  (SK Dyne 1102 X : made by Soken Kagaku K.K.)
- o crosslinked acryl group resin particles 56 parts
  (MR-7HG: made by Soken Kagaku K.K.)
- o ethyl acetate 50 parts
- o butyl acetate 50 parts
- o epoxy resin (crosslinking agent) 0.6 parts
  (SK Dyne E-AX: made by Soken Kagaku K.K.)

[0015]
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  (Teku Polymer SBX-6: made by Sekisui Kaseihin Kogyo K.K.)
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- o butyl acetate 50 parts
- o isocyanate (crosslinking agent, NV: 75%) 0.4 parts
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[0017]
[COMPARATIVE EXAMPLE 2]
Instead of crosslinked polystyrene resin particles in the example 3, calcium carbonate (Sunlite SL-700: made by Takehara Kagaku Kogyo K.K.) 40 parts were used.

[0010]

As for the light diffusion agents, any types may be used providing they are resin particles showing solvent resistance against solvent used; and it is recommended to use the ones showing less hiding property. As such agents, for instance, crosslinked acryl group resin particles having the main component of polymethyl methacrylate, crosslinked polystyrene group resin particles, or silicone group resin particles and the like may be mentioned. Although it cannot be simply states as to the particularly preferred agents among said light diffusion agents in accordance with refractive index of resins which are used or types of crosslinking agents, when acryl group resins and crosslinking agent of isocyanates are used, use of crosslinked polystyrene resin particles is recommended. As for the rate of addition of light diffusion agents, although it varies according to light diffusion property required, types of resin particles, and particle diameter of resin particles, it may be generally 5 to 300 % , or more preferably, 10 to 100 % based on pressure sensitive adhesive resins. The reason for specifying as 5% is to attain appropriate light diffusion property; and the reason for specifying as 300% is so not to reduce pressure sensitive adhesive force.

[0011]

Then, as for the mixing method of these, first of all, light diffusion agents are mixed in a solvent, and after dispersing and mixing this solution and pressure sensitive adhesive resins, crosslinking agents are added prior to use, and then, is used. When they are mixed and are immediately used, it is all right to add crosslinking agents, and, then, may be dispersed and mixed with pressure sensitive adhesive resins.

[0012]

[Actions]

Through above-explained constitution, it becomes possible to uniformly disperse with a simple stirring; and therefore, there is no need for studies on addition of dispersion stabilizers or dispersion device such as three rolls and the like. In addition, because resin particles are used, display with high light diffusion effects as well as high luminance becomes possible. As there is no need to use dispersion stabilizers, crosslinking of resins can be conducted easily to significantly reduce oozing or adhesive transfer of pressure sensitive adhesive agents, and furthermore, it is possible to significantly improve close adhesion to a base material.

[0018]
[COMPARATIVE EXAMPLE 3]
Instead of crosslinked polystyrene resin particles in the example 3, calcium carbonate (Sunlite SL-700: made by Takehara Kagaku Kogyo K.K.) 8 parts were used; and in addition, no addition of crosslinking agents was made.

[0019]
[COMPARATIVE EXAMPLE 4]
No addition of crosslinking agents in the example 3 was made.

[0020]
[COMPARATIVE EXAMPLE 5]
Instead of crosslinked polystyrene resin particles in the example 3, calcium carbonate (Sunlite SL-700: made by Takehara Kagaku Kogyo) 8 parts were used; and in addition, 3 parts of triethyl amine was added as a dispersion stabilizer.

[0021]
[COMPARATIVE EXAMPLE 6]
Instead of crosslinked polystyrene resin particles in the example 3, calcium carbonate (Sunlite SL-700: made by Takehara Kagaku Kogyo K.K.) 8 parts were used; and 3 parts of triethyl amine as a dispersion stabilizer was added, and crosslinking agent was not added.

[0022]
As for the processes described in the examples 1 through 3 and comparative examples 1 through 6 explained above, they were conducted by first mixing light diffusion agents in a solvent, and then, dispersing and mixing this with pressure sensitive adhesive resin, and then, crosslinking agents, dispersion stabilizers were added as needed to give a pressure sensitive adhesive agent with light diffusion property. According to the pressure sensitive adhesive agents with light diffusion property in above-explained examples 1 through 3 and comparative examples 1 through 6, tests described below were conducted, and results are shown in the Table 1.

[0023]
Dispersion property: According to stirring conduct in a stirrer (Dissolver MDH-V-1 model: made by Inoue Mfg. K.K.), [◎] marking was applied when mixed uniformly at 1000 rpm for 20 minutes of stirring; and [o] marking was applied when mixed uniformly for 24 hours of stirring; and [x] marking was applied when it was not possible for uniform mixing unless three rolls were used.

[0024]
Light diffusion property: After coating a pressure sensitive adhesive agent with light diffusion property on a transparent polyester film with 100 μm thickness to give 30 μm dry film thickness, it was pasted on a surface of LED display panel to be displayed; and [x] marking was applied when individual dot light source was recognized as dot light source; and [o] marking was applied when was hardly possible to recognize; and [◎] marking was applied when was totally unrecognizable.

[0025]
Light transmissivity: On a transparent polyester film with 100 μm thickness, pressure sensitive adhesive agent with light diffusion property was coated at 30 μm dry film thickness; and this was measured with a spectrum photometer.

[0026]
Adhesive transfer: After coating pressure sensitive adhesive agent with light diffusion property on a transparent polyester film with 100 μm thickness, it was pasted onto an ABS resin panel, and was peeled to judge with [o] marking without remaining pressure sensitive adhesive agent on the ABS resin panel, and with [x] marking showing residual adhesion.

[0027]
Storage stability: A pressure sensitive adhesive agent with light diffusion property prior to addition of crosslinking agent was stored for 3 months at room temperature; and the one that can be used with simple stirring is marked as [o], and the one that cannot be used due to gelation is marked as [x].

[0028]
[E: example, CE: comparative example]

[Table 1]

	dispersion property	light diffusion property	light transmissivity 550 nm	light transmissivity 650 nm	adhesive transfer	storage stability
E 1	◎	◎	78%	79%	o	o
E 2	◎	o	82%	83%	o	o
E 3	◎	◎	79%	80%	o	o
CE 1	x	x	72%	73%	o	x
CE 2	x	o	65%	69%	o	x
CE 3	x	x	73%	74%	x	x
CE 4	◎	◎	79%	80%	x	o
CE 5	gelation	-	-	-	-	-
CE 6	x	x	73%	74%	x	o

[0029]
The pressure sensitive adhesive agents with light diffusion property of the examples 1 through 3 showed good performance based on all evaluations. Because pressure sensitive adhesive agent with light diffusion property of the comparative example 1 uses inorganic particles, uniform mixing could not be attained even after 24 hours of stirring in a stirrer; and it was necessary to use 3 rolls in order to attain a uniform mixture. In addition, it lacked light diffusion effect, and luminance was poorer than that of the examples. Furthermore, after 3 months of storage, it could not be used again unless it was dispersed with 3 rolls one more time.

[0030]
The comparative example 2 shows increased rate of addition of inorganic particles till light diffusion effect is given due to poor light diffusion effect of pressure sensitive adhesive agent with light diffusion property of the comparative example 1; however, it showed fair drop of luminance, and could not withstand application. The comparative example 3 shows use of inorganic particles, and no addition of crosslinking agent; and it showed poor results in all evaluations. The comparative 4 shows use of resin particles and no use of crosslinking agent; and because resin particles are used, despite of good dispersion property and light diffusion property, adhesive transfer occurred due to poor cohesive force of the pressure sensitive adhesive agent.

[0031]
The comparative example 5 shows addition of dispersion stabilizer to improve dispersion stability of pressure sensitive adhesive agent with light diffusion property of the comparative example 1; and showed gelation, and could not withstand application. The comparative example 6 shows no addition of crosslinking agent in order to prevent from gelation of the comparative example 5; however, because it uses inorganic particles, uniform mixing could not be attained even after 24 hours of stirring in a stirrer; and required use of 3 rolls to attain uniform mixing. In addition, it showed poor light diffusion effect, and luminance was lower compared to those of the examples. Furthermore, as crosslinking agent is not added, cohesive force of pressure sensitive adhesive agent was poor to initiate adhesive transfer.

[0032]
[Effects of this invention]
As it is clear from above explanation, this invention's pressure sensitive adhesive composition with light diffusion property shows possible easy uniform mixing without requiring addition of dispersion stabilizers or equipment such as 3 rolls because it uses resin particles as light diffusion agent; and in addition, as it uses resin particles, it provides high light diffusion effect as well as plane light source with high luminance. Furthermore, as it uses crosslinking agents, cohesive force of pressure sensitive adhesive is high, and it is possible to significantly reduce oozing of pressure sensitive adhesive agent or adhesive transfer; and in addition, it is the pressure sensitive adhesive composition with light diffusion property with much improved close adhesion to a base material.

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